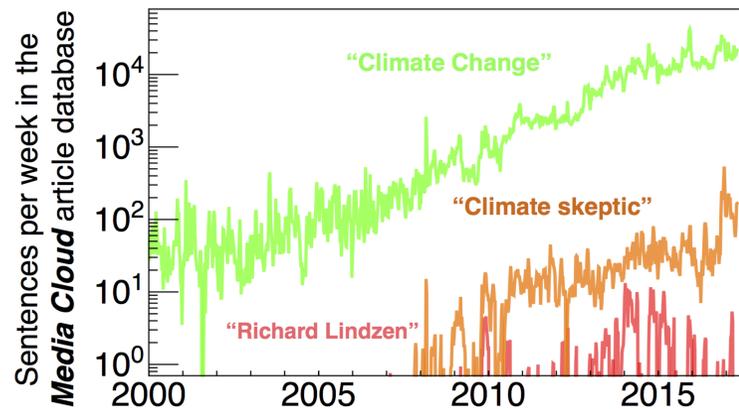


Climate Change Contrarians (CCC) have tactically organized a successful media disinformation campaign against CC science. Since little is known about these individuals and their sources of authority, we used data-driven methods to quantitatively compare the visibility of a prominent set of CCC comprised of scientists, businessmen, and politicians to a set of proven expert CC scientists (CCS). By analyzing their digital footprints in two large datasets (200,000 research publications and 120,000 English-language media articles), we find that CCC maintain higher media visibility (CCC have 37% more media articles) despite their relatively low scientific expertise (CCS have 660% more citations).

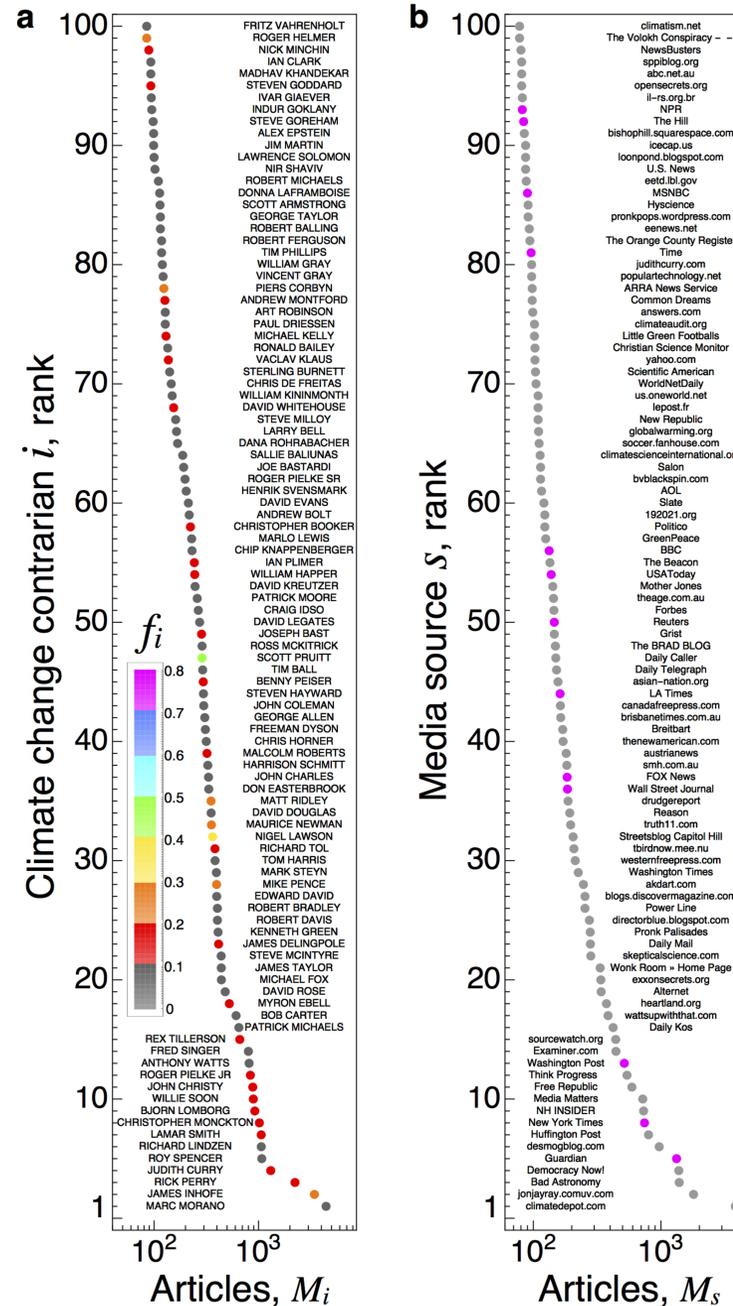
## “Climate Change” communication: Tracing digital imprints in published research and online media



### DATA SOURCES:

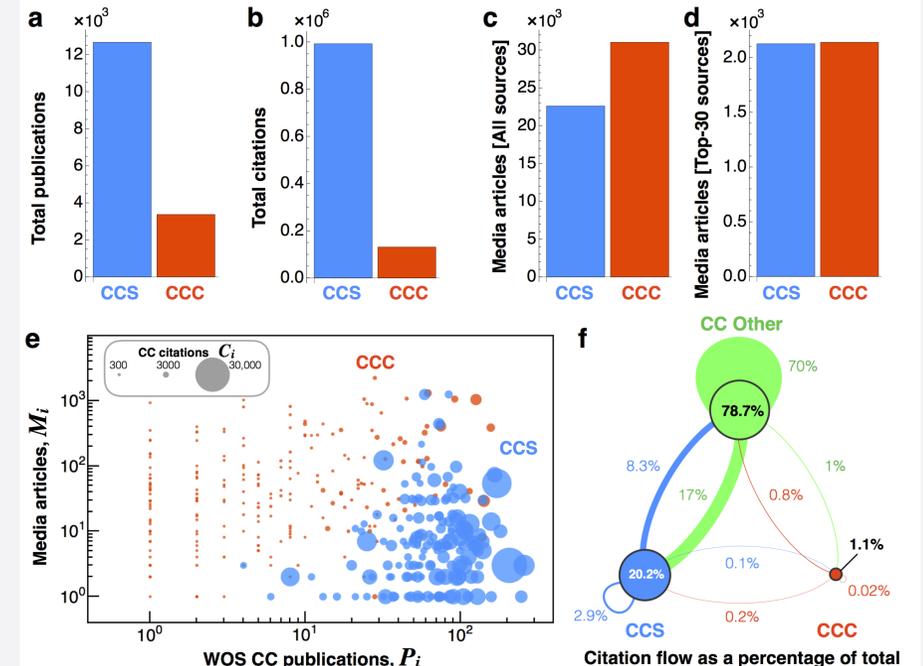
- **Media Cloud (MC)** - <https://mediacloud.org/>: 121,729 unique print articles, online articles, and blog posts on “climate change” derived from 7,126 unique media sources (e.g. New York Times, Brietbart.com) collected by the *Media Cloud* project (MC), an open data project hosted by the MIT Center for Civic Media and the Berkman Klein Center for Internet & Society at Harvard University.
- **Web of Science (WOS)**: we collected a dataset of 198,789 “Climate Change” articles from Clarivate Analytics Web of Science.
- **386 Climate Change Contrarians (CCC)** compiled from three sources: (a) former speakers of The Heartland Institute “ICCC conference”; (b) individuals profiled by the DeSmogblog.com project; (c) authors of the most recent 2015 “Nongovernmental International Panel on Climate Change” (NIPCC) report (the principal summary of climate change denial argumentation produced in conjunction with The Heartland Institute).
- **386 Climate Change Scientists (CCS)**: top CC researchers derived from the WOS dataset on “Climate Change”, ranked according to the net citations  $C_i$ , tallied across each individual’s CC publications.

## Individual contrarians gain visibility from diverse media sources including the mainstream media



**Prominent climate change contrarians in the media.** (a) The 100 most-prominent CCC in the media, ranked according to the number of MC articles. The color scale associated with each CCC indicates the fraction  $f_i$  of his/her articles that appear in 30 mainstream media sources. (b) The 100 most prolific CC media sources among all the articles associated with the entire set of 386 CCC.  $M_s$  denotes the total number of articles for a given media source, tallied across the pooled set of CCC articles. The magenta points are members of the mainstream media group.

## Disparity in Scientific Authority and Media Visibility



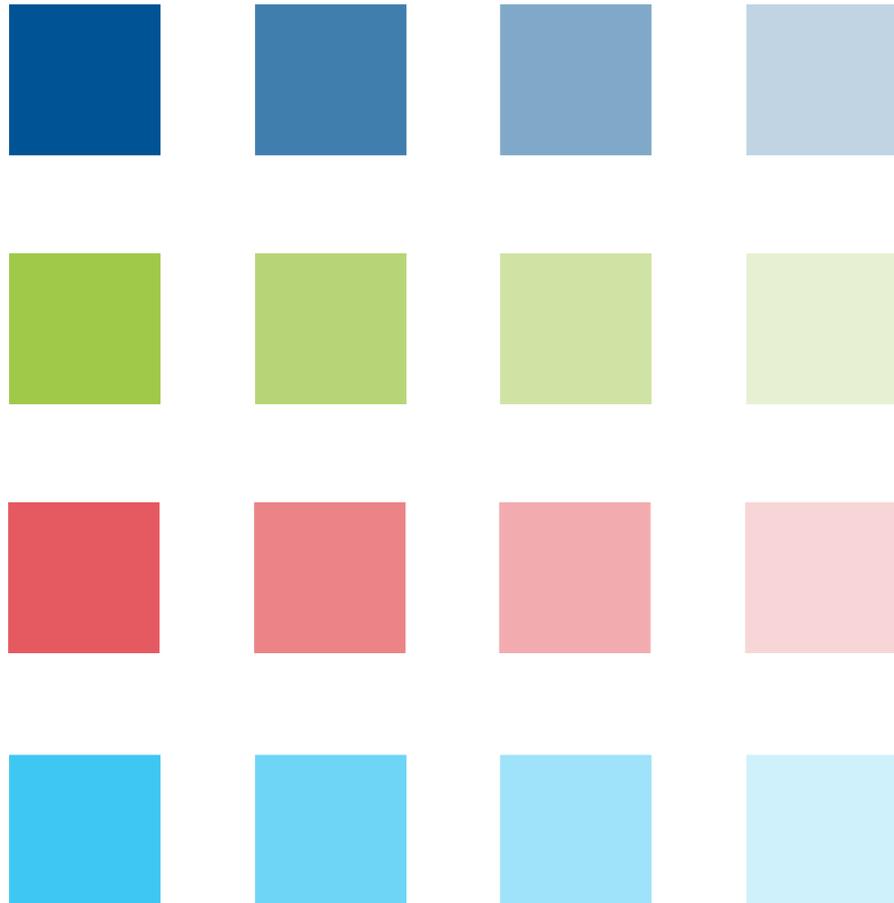
**Individual and group-level comparison of CCC and CCS.** (a) Total number of unique publications by CCC (red) and CCS (blue). (b) Total number of citations from the publications in (a). Total number of unique media articles: (c) from all media sources, and (d) from 30 mainstream media sources. (e) Scatter plot of individual CC authority, measured by the number of publications  $P_i$  by authority  $i$ , versus the CC media visibility, measured by the number of MC articles  $M_i$ ; point size is proportional to the number of WOS citations  $C_i$ . (f) Within-group and between-group citation flow as a percentage of the total number of citations produced across three researcher groups. Node size captures the net citation flow into a given group; link width is proportional to the fraction of the total citation flow, with link color indicating the source group -- e.g. 20.2% of the total citations are directed towards the top 224 CCS (corresponding to 0.44% of the total 50,442 researchers analyzed), whereas only 1.1% are directed towards the 224 published CCC; roughly 17 times as many citations flow from the CC Other to CCS as from the CC Other to CCC.

## CONCLUSIONS

- **CC scientists** must exert their scientific authority in scientific & public discourse, e.g. providing media feedback - <https://climatefeedback.org/>
- **Professional journalists and media editors** should correct the disproportionate attention given to CCC with little authority on CC
- **Computational Social Science and CC Communication:** The democratization of information and voice yields a paradox regarding free speech, the role of expertise, and the spreading of misinformation. We demonstrate how tracing digital footprints in scientific and public discourse can reveal modes of organizational tactics underlying the CC disinformation campaign, which highlights the importance of expertise at the science-society interface. As such, by mining the intersection of distinct data repositories we provide new insights on the drivers of public polarization around critical yet controversial socio-political issues.

# Climate Change contrarians receive significant (in)advertent help from the media in spreading CC disinformation

## Colors to use in charts and graphs



## Charts and Tables

Since there will be a lot of information on your poster, keeping tables and charts simple and easy to understand is much better than an in-depth and complicated graphic. There are a few simple tricks to simplify charts and tables:

1. Remove unnecessary borders, lines, drop shadows, and backgrounds
2. Remove unnecessary labels and markers
3. Use flat styles and solid colors
4. Highlight important values